

# Amphibian Diseases

***Salamanders, tadpoles, frogs, and toads worldwide are dying from viral and fungal diseases and from unknown causes.***

**Amphibian populations worldwide are declining from unknown causes even in remote and pristine areas.** In addition, sudden die-offs of scores or thousands of amphibians have been observed and investigated in the last 5 years. USGS scientists are studying healthy, sick, and dead amphibians to determine if the diseases associated with sudden, dramatic die-offs are linked to insidious population declines. Because amphibians live in surface water and on land, they are good early barometers of significant environmental changes that initially may go undetected.

**Between 1999 - 2002, large numbers of tadpoles, frogs, toads, newts, and salamanders died or became sick in 26 States from California to Maine.** The dead and ill amphibians were found on private, State, and Federal lands, including several National Parks and Wildlife Refuges. Many of the amphibian species involved in die-offs are fairly common and widespread in the United States, but some are either declining in number or are already threatened or endangered species.

**An alarming number of amphibian deaths at numerous sites were caused by iridoviruses.** Amphibians infected with the virus may be lethargic, swim in circles, and be unable to remain upright. They may also have red spots and swollen skin areas. Iridoviruses are a well known cause of death in fish and some insects, but they do not infect warmblooded animals. USGS scientists have isolated iridoviruses associated with die-offs involving 16 species of amphibians from single and multiple mortality events in 15 States. In some of these events, both frogs and salamanders from the same pond died from the virus infections at the same time.

Occasionally, ill or dead small fish, such as minnows and sticklebacks, are found in the same ponds and lakes where amphibians are dying. Scientists are trying to determine if lethal amphibian iridoviruses can infect fish and if fish iridoviruses can infect amphibians.

**In the western United States, the endangered Wyoming toad and the boreal toad, which is found in Colorado, have been afflicted with a recently identified infection, a chytrid fungus.** Toads that are infected with the fungus have skin abnormalities, and they are weak and lethargic; they therefore do not flee from danger. Boreal toads were once common around lakes, ponds, and streams in the mountains of Colorado, northern New Mexico, and Wyoming, but their numbers have dropped precipitously during the last 20 years.

**The chytrid fungus infection was first described following massive amphibian die-offs in Panama and Australia in 1998.** Scientists do not know how the chytrid fungus is transmitted from one area to another, let alone why the fungus is affecting amphibian populations worldwide. The infection has killed at least 10 amphibian species from Maine to North Carolina, from Illinois to North Dakota, and from Wyoming to California. In North Carolina, USGS scientists found frogs with chytrid fungus infections at two locations, and this may offer a clue to the rapid decline of the gopher frog and the flatwoods salamander in the southeastern United States.

**Some amphibian diseases may have far-reaching importance to fish, turtles, snakes, and other animals that share their habitat with amphibians.** Until informa-



*Tiger salamander with skin ulcer caused by iridovirus.*

tion about these diseases is known and the health of amphibians and other species can be assessed by basic tests, understanding the causes of population declines will remain difficult. New diseases that await discovery may help to explain the declines of some amphibian populations.

**Sick and dead amphibians are often sent to the USGS National Wildlife Health Center in Madison, Wis. to determine the causes of the illnesses.** The USGS and scientists from the U.S. Fish and Wildlife Service, the National Parks, the National Wildlife Refuges, the Bureau of Indian Affairs, nongovernmental organizations, universities, and State wildlife agencies are working together to determine the causes of amphibian declines and are collecting baseline amphibian health and population data.



*Media filming a frog examination.*

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